PV20a and PV30a pellet burners

User manual

DK9902A1

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Name of product: Pellet burners PV20a and PV30a
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Safety

- Do not start the burner before it is connected to the boiler and the boiler is connected to the chimney.
- When the burner is connected to the main power supply the burner casing must always be mounted.
- Always make sure that the burner is unpluged from the main power supply before performing any cleaning or maintenance.
- Keep children away and do not touch the equipment during operation.
- Make sure that no flammable or liquid materials are stored in the boiler room or vicinity of the boiler.
- It is recommended to wear a respirator while handling pellets.
- The boiler room where the burner is installed must fulfill all rules and recommendations in accordance with local codes and regulations.
- All electrical installation, plumbing, chimney sweeping and service work shall be done by certified and qualified personnel in accordance with local codes and regulations.

Warnings

- Changing the construction of the burner without written permission from the manufacturer is forbidden.
- Use only spare parts provided or approved by the manufacturer in order to avoid any damage to the burner and dangers resulting from it.
- Welding is allowed only after disconnecting the burner from electric supply. The controller must be removed from the burner before welding.
- Do not open boiler door while the burner is in operation.

Notice

- Manufacturer of burners has right to make changes in construction of burner and its firmware.
- Present user manual is original user manual for PV20a and PV 30a pellet burners.

Pellet burners PV20a and PV30a correspond to following standarts and directives:

EN 15270 2008
EN 230 2005
EN 60335-1
EN 60335-2-102
EN 60730-1
EN 60730-2-5
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 55014-1
2004/108/EC
2006/95/EC
2001/95/EC
2006/42/EC

Pellet burner PV 20a		No
Year of production	2014	
Electrical supply	230V	
Max heat input	20kW	
Emission class	5	
Noise emission	52dB	
Power consumption at stand-by	7 W	
Manufacturer: Pelltech OÜ, Sära tee 3, Peetri, Estonia		

Pellet burner PV 30a		No
Year of production	2014	
Electrical supply	230V	
Max heat input	30kW	
Emission class	5	
Noise emission	52dB	
Power consumption at stand-by	7 W	
Manufacturer: Pelltech OÜ, Sära tee 3, Peetri, Estonia		

CE

DECLARATION OF CONFORMITY

We, Pelltech OÜ
Sära tee 3, 75312 Peetri, Rae vald, Estonia
www.pelltech.eu

Declares under sole responsibility that the machinery described as

Pellet burner, Type PV 20a and PV 30a

to which this certificate applies, is in conformity with the standards or other applicable rules and regulations as mentioned below.

Conformity with the stipulations of:

EN 15270 2008
EN 230 2005
EN 60335-1
EN 60335-2-102
EN 60730-1
EN 60730-2-5
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 55014-1
Directive 2004/108/EC
Directive 2006/95/EC
Directive 2001/91/EC
Directive 2006/42/EC

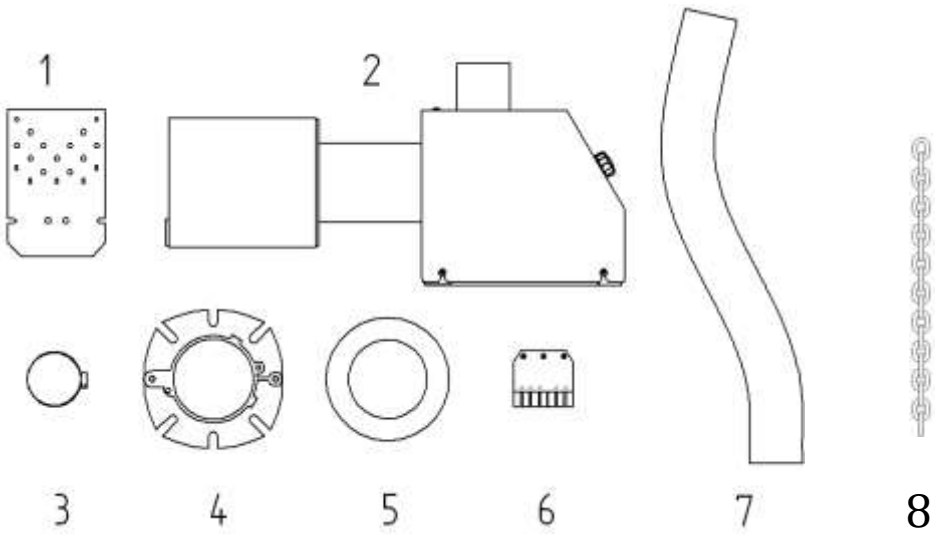
Tallinn 20.06.2013

Aavo Isak, CEO, member of board

Package contents

The burner is shipped with following components included:

1. Grate
2. Burner
3. Brackets for hose (2x)
4. Flange
5. Ceramic seal
6. 7-pole boiler connector
7. Hose
8. External auger's fixating chain



1 Description

Pellet burner PV20a/30a was originally designed as cheeper replacement burner for existing heating systems with expensive oil burners. Both burners can also be mounted to new oil, biomass or universal boilers. The burner is multistage type , meaning it can vary its output power according to the needs of the heating system. Both burners have similar construction and working principles. They differ only by size of burning chambers and maximal output capacity.

PV 20a/30a is a pellet burner that is intended to be used with 6 or 8mm diameter premium class ENPlus-A1 wood pellets. You cannot use any other fuel to run those burners. The PV20a/30a burner is connected to the boiler with a standart 90 mm flange (similar to oil burners).

Unique electric ignition and automatic power level control make the pellet burner using easier through the whole year. No pilot flame is used in burning procedure.

For protection against back-burning the burner is equipped with a safety thermostat, a hose from melting material, temperature sensor and back up battery.

Burner main components are depicted on Figure 1.

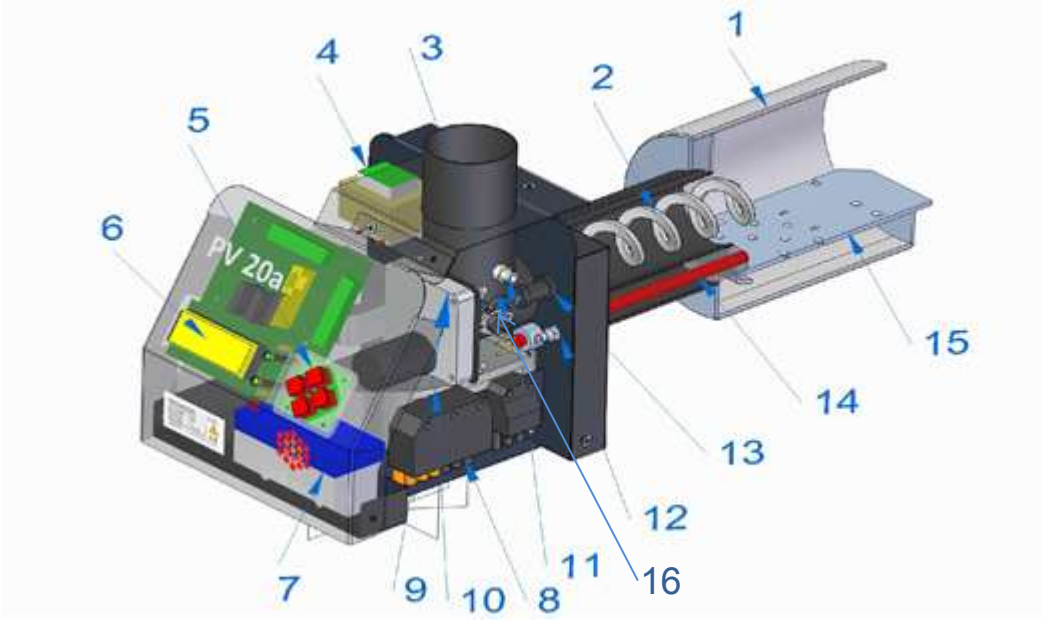


Figure 1 Burner main components

1.	Burning chamber	The place where pellets are burnt. Tube is made of heat resistant 4mm steel 253MA.
2.	Feeder auger	Transports pellets to the burning chamber. Delivered amount of pellets depends on burner's capacity. The feeder spiral is connected to feeder motor with noticeable slack in order to prolong motor's and feeder's lifetime. Do not overstrain the cap screw of the spiral.
3.	Overheat temperature sensor	Turns off the mains and external auger, when feeder augers temperature rises above pre-set limits.
4.	Mains transformer	230/12V transformer for el. supply of controller and feeder auger.
5.	User interface buttons	Enables to move in menus and set or change burner parameters.

6. User interface screen	2-row screen to display burner status and to change its settings.
7. Battery	Enables to empty feeder auger and finish burning pellets in burning chamber when mains power is lost (blackout) or safety thermostat has turned burner off. It takes approx. 30 minutes.
8. Sockets	For connecting the mains supply, boilers thermostate and external auger.
9. Feeder auger motor	Rotates internal feeder in order to transport pellets to burning chamber.
10. Fan	Blows air to burning chamber according to actual burner power level.
11. Fuel level sensor	Optical sensor, what starts external auger. Sensor consists of sender – receiver pair.
12. Mounting nut	M6 nut connects burning chamber to burner housing
13. Flame sensor	Optical sensor to detect flame in burning chamber.
14. Igniter	Electrical heating element what heats up the air and ignits pellets.
15. Grate	Grate with air supply holes made of heat resistant 4mm steel 253MA on what pellets burn.
16. Safety thermostat	Turns off the mains and external auger, when feeder augers temperature rises above limit. It is a safety measure against back-burning.

1.1 Principal function

The PV20a/30a burners are meant to be installed in a boiler and fuelled with wood pellets. The external auger transports the pellets from a pellet container to the burner. The controller board contains a microprocessor system that tests main safety components, monitors and regulates the burning procedure, starts and stops the burner automatically according to the boiler temperature. A warm air element (electrical igniter) ignites the pellets. The start procedure is designed to create a quick and smoke free ignition.
The burner starts burning when the boiler temperature cools down and boilers thermostat switches on. Burner runs until the pre-set maximum boiler temperature (switch-off temperature) has been reached. After that burner stops safely burning procedure and goes to waiting (stand by) status.
Main supply interruptions (blackouts) are taken care of by the control system. After a main supply interruption burner stops safely burning and goes to stopped status.
If there is a safety risk, the burner switches off.

1.2 Safety devices

The burner has following safety devices (Figure 2) against back-burning and other dangerous situations.

1. Melting hose
2. Temperature sensor
3. Controller
4. Back up battery
5. Safety thermostat

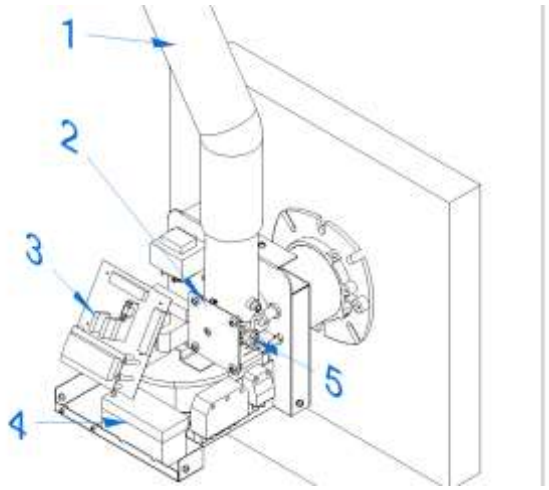


Figure 2 Safety devices

1.Melting hose

To avoid the reaching of fire during back-burning to external auger, a melting hose is put between external auger and pellet burner. The hose will melt when air temperature in it's inside reaches 100°C.

2.Temperature sensor

A temperature sensor is mounted on burners input tube. If the burner is not regularly cleaned, part of burning gases start to move through fuel line. The sensor detects temperature rise in fuel line and shuts down the burner when temperature inside burner exeeds 60°C. This safety device is not meant to replace regular cleaning by the user.

3.Controller

Software supervison made by controller monitors continuously all inputs and outputs and shuts down the operation of burner in case of abnormal condition occur. Controller has watchdog timer WDT to reset the controller in case program lock up. It also has a brown-out detection and reset circuit to reset the controller when power supply voltage falls below threshold. Burner makes self-testing after applying power. Following is checked:

- Existence of feeder auger motor current (motor is turned on for a moment)
- Existence of speed signal from fan (fan is turned on for a moment)
- Voltage level on backup battery is > 11V when loaded with feeder auger motor

or last error message is displayed.

To ensure there are no explosive gases inside the boiler, the fan is ran for short duration before loading/ignition starts.

4.Backup battery

If mains supply is lost, the burner runs on backup battery power and feeder auger transports pellets from feeder's tube to the burning chamber, where they burn finally with help of natural draught. Fan rotation and all other functionalities are stopped. Battery voltage is checked allways at startup and continuously monitored during the operation.

5.Safety thermostat

In case back-burning has reached into feeder auger, safety thermostat cuts mains power off and feeder auger is unloaded by using battery power. Thermostat acts at 65°C and has to be reset manually.

1.3 Specification

Table 1 Burners' main measurements

Description	Unit	PV20	PV30
L *total lenght*	mm	540	570
L1 *burner housing lenght*	mm	230	230
L2 *burning chamber lenght*	mm	170	200
ØD *burning chanber diameter*	mm	146	162
ØD1 *burning chamber neck diameter*	mm	88.9	88.9
ØD2 *internal feeder inlet diameter*	mm	60	60
H *total height*	mm	240	240
H1 *burner housing height*	mm	200	200
W *total width*	mm	220	230
W1 *burner housing width*	mm	205	205
Mass	kg	11.2	12.2
Burners nominal capacity	kW	20	30
Burners minimal capacity	kW	10	14
Emission class EN 15270	-	5	5
Noise level	dB	52	52
Working temperature	°C	0 - 60	0 - 60
Mains supply voltage	VAC	220-240	220-240
El. power at ignition	W	570	570
El. power, average	W	25 - 40	30 - 40
El. power at standby	W	4	4

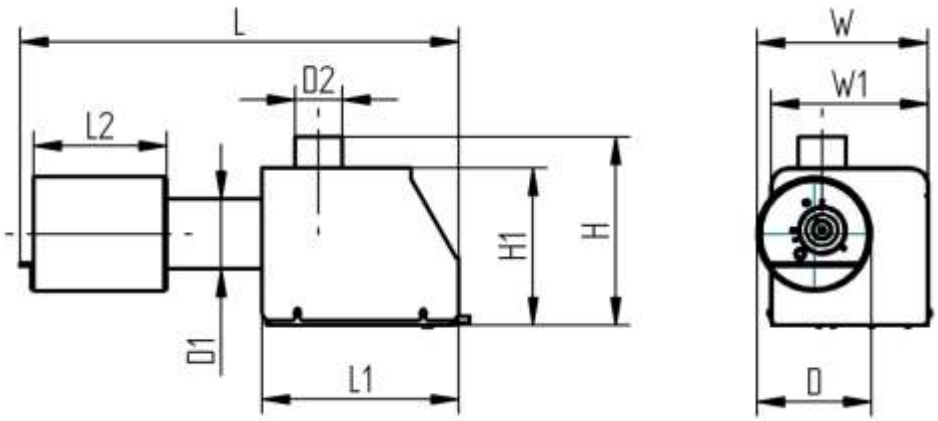


Figure 3 Main measurements

1.4 Pellets

Wood pellets or saw dust granules are concentrated and homogenized wood fuel made by pressing dried and comminuted wooden waist like sawdust and cutter shavings. Also stem wood is used. During pressing no extra materials are added, pellets are held together by a natural ingredient found in wood – the lignin. Pellets are neutral, renewable fuel. Its burning doesn't spoil CO_2 balance in the atmosphere. Pellets have to be stored in a dry and ventilated room. Only premium wood pellets e.g. ENPlus-A1 can be used in PV20a/30a burners. Table 2 provides an overview of the most important wood pellet properties and threshold values.

Table 2 Wood pellets properties

Raw material	Sawdust,cutter shavings and stem wood
Calorific value	4700-5100 kWh/ton
Bulk density	ca 650-670 kg/m^3
Volume of 1 ton	1.5-1.6 m^3
Diameter	6-8 mm
Length	3-5 x diameter
Fines content (<3,2 mm)	<0,5%
Moisture content	8-10 %
Ash content	< 1%
Ash fusion	> 1200 ^oC
To replace 1000 l light oil	ca 2 tons or 3 m^3

Burner, external auger and container are common system. The size and location of the pellet container depends on the needs and possibilities of bolier room or boiler room. While choosing the pellet container you must keep in mind that:

- if the pellet container is in the same room as the boiler, then the size of the pellet container must not exceed 500 liters (approx. 350kg).
- the container must be made of fireproof materials.
- the container must be positioned in a way that the raising angle of the feeding auger does not exceed 45°. Figure 11.
- the container could be closed with a cover.

2 Installation

2.1 Requirements to the boiler and boiler room

In order to install the burner, the boiler must correspond to the following requirements:

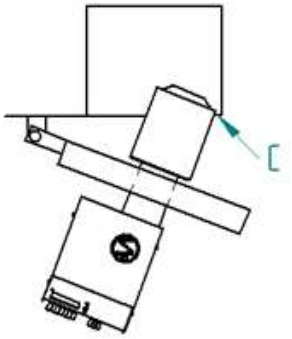
- The door of the boiler must have a 90 mm opening (placement opening for the oil burner).
- The thickness of the boiler door must be less than 100mm
- The construction of the boiler must make it possible to open the door of the boiler with the burner connected and removing ash from the furnace. If the door of the boiler is too narrow for opening it with the burner, then extra hinges must be installed.
- If there is not sufficient negative pressure (less than - 5Pa)in the furnace, a flue gas fan should be installed for the exhaust gases.
- The boiler room where the burner is installed must fulfill all rules and recommendations given by authorities.
- The boiler must be positioned in a way that there is enough space for cleaning the burner, the boiler and the smoke pipe and removing the ash.

If flue gas temperature at the top of the chimney is less than 80C^o, there is a risk of condensation. This makes pitch and brakes into pieces stone chimney. In this case a stainless steel pipe should be installed into the chimney.

Notice: It is recommended to use a flue gas analyzer for adjusting the burner. The burner must be adjusted also when you use pellets with different quality.

Pellet burners need regular cleaning and therefore boiler construction must allow the door to be opened without removing the burner. The minimum size of opening in boiler depends on the position of door hinges. Figure 4 below illustrates the situation. Point C is critical.

In order to keep door width minimum and boiler opening as small as possible, a double hinge solution can be used. As double hinges add another degree of free movement, the boiler's door must be fastened on both sides. Slide-out doors with guide rails is also an option.



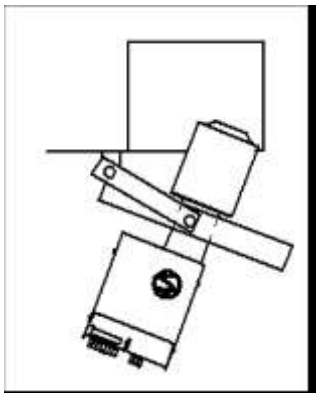


Figure 4 Hinge position and boiler opening size considerations

Double hinges

Boiler firebox lenght L Figure 5 must be at least 2 times longer than the length of burner's burning chamber (accordingly L=350 or 400 mm). Distance from the end burning chamber to firebox back wall L1 is about 180 or 200mm. The height of firebox must leave space at least 100mm (H1) for ash below burning chamber and 100mm above burning chamber. Minimum boiler firebox dimensions for PV20a are: L ≥350mm; H≥350mm and for PV30a L ≥400mm; H≥370mm.

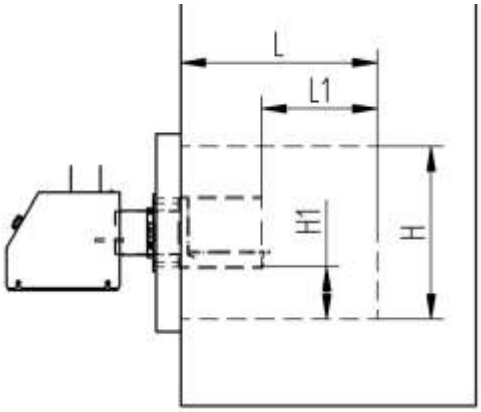


Figure 5 Required measurements for firebox

The burner is mounted to boilers door using supplied oil burners mounting flange. Bolt hole circle diameter and bolt sizes can be customized by using custom flanges. D1 and D2 given in Table 3 and Figure 6 are valid only with supplied flanges.

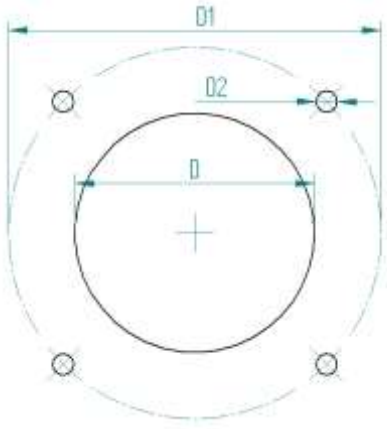


Figure 6 Mounting holes with supplied flange for boiler door

Table 3 Mounting hole measurements

Measurement	Unit	Value
⌀D *hole for burning chamber neck*	mm	90
⌀D1 *flange bolt ring diameter*	mm	130..150
⌀D2 *bolt holes*	mm	8..9

2.2 Installation of the burner to the boiler

Following tools are needed to install the burner:

- Spanner no. 13 for fixing the mounting flange to the boiler's door.
- Spanner no. 10 for connecting the burning chamber to burner housing.
- Crosshead screwdriver for fixing the cover of the burner.
- 4 mm hex wrench for fixating the burner to the flange.

In order to install the burner properly, you must go through the following steps:

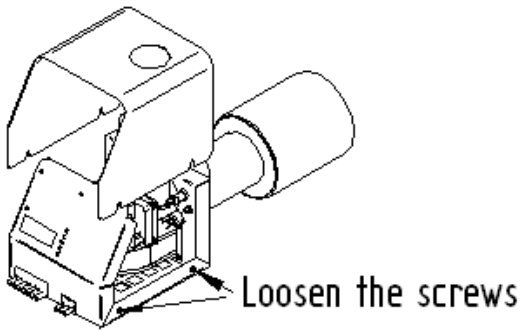


Figure 7

1. Remove the cover of the burner by loosening 4 screws of the cover. There is no need to remove the screws Figure 7 .

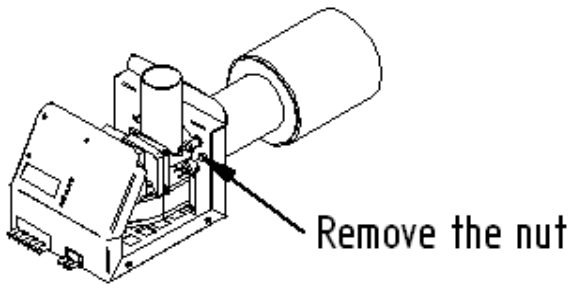


Figure 8

2. Remove the burning chamber from the burner by releasing the M6 nut (Figure 8) that connects the 2 halves of the burner.
Separate the halves of the burner by pulling the burning chamber and slightly turning it at the same time.

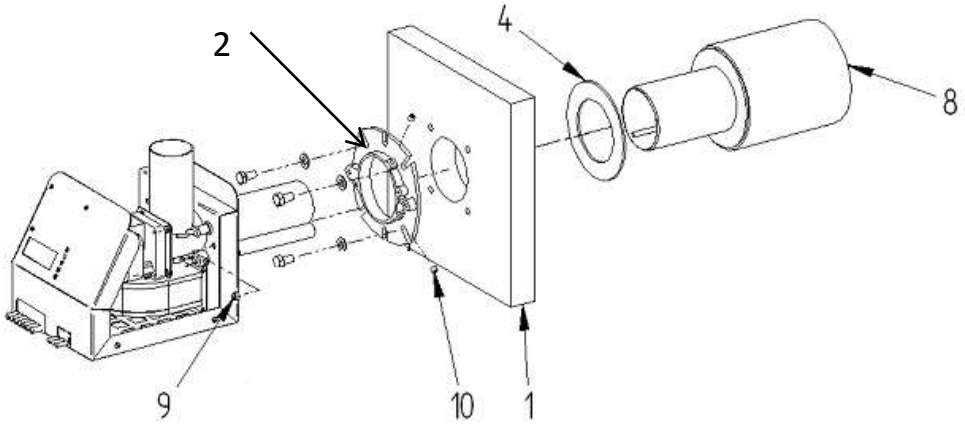
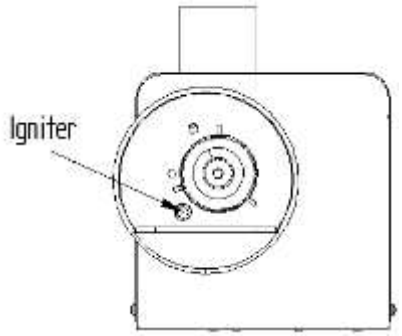


Figure 9

3. Fix the flange (2) to boilers door (1). (Figure 9). Make sure that opening of flange and the opening of the boiler's door are aligned.
4. Fix the burning chamber (8) to boilers door (1). For that you need to put a ceramic seal (4) on the narrower side of the burning chamber and then put the chamber through the door of the boiler (1) in a way that the rearward wall of the burning chamber would lean on the door of the boiler. Fixate the burning chamber (8) with two grub screws (10) to the flange.
Notice! The burning chamber must be mounted in a way that the burning grate will be as horizontal as possible. The connection between the burner and the boiler must be tight in order to avoid any leakage of flue gases.
5. Connect the housing of the burner to the burning chamber like it was done before disassembling in step 2.
6. Fixate the halves of the burner with a M6 nut (9). The nut has to be fastened tight but not too hard.
7. Make sure the halves of the burner are connected correctly. Make sure that when looking through the fire tube the igniter its end tip is at the same level with the reward wall. The tube of the feeder auger must reach through its opening.



Caution! After the installation of the burner always make sure that the end of the igniter is positioned through its opening and not stuck behind the dividing wall. Figure 10.

Igniter must not be in direct touch with pellets and flame. Vice verse it will burn out quite fast.

Figure 10 Right placement of igniter

2.3 External auger

The external auger transports pellets from the pellet container to the burner. The burner controls the work of the external auger. The external auger is connected to the burner with a special Ø 60mm hose. The hose is made of melting polyurethane material. It acts as a safety measure against back-burning because melts in back-burning.

External auger can be fixed to a ceiling or container depending on conditions at the site.

Figure 11 depicts correct installation of external auger. As melting hose is a safety element, it has to be installed strictly as follows:

- Hang auger to ceiling or fixate it to the boiler in the way mentioned below.
- Install hose between auger and burner. Fixate hose with 2 brackets from both ends.
- Connect auger's cable to burner. Make sure that plug is surely connected with socket.
  Be sure, that:
- The vertical distance between the output of external auger and burner has to be 400 – 700 mm.
- The horizontal distance between the output of external auger and burner has to be 100 – 200 mm. It ensures hose to be smelt when back- burning arises and fire does'nt reach to container.
- The raising angle of the auger must not exceed 45° to ground. Vice verse auger doesn't manage to transport enough pellets.
- In order pellets can freely fall into burner the falling angle must be between 50° and 85°.

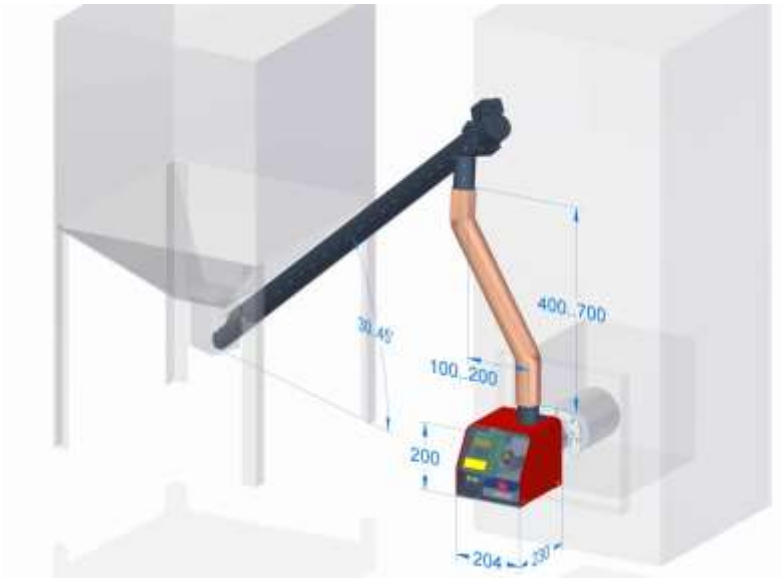


Figure 11 External auger placement

2.4 Electrical connections

The burner is equipped with a standard oil burner plug (under red cover on right side) that has 7 contacts. There are different connection schemes used for different boilers. Usually the burner is connected to the boiler with a 5- wire cable (Figure 11). Also is possible 4-wire connection. In both cases connection of boiler thermostat 'Tt' is different. In Figure 13 there are depicted socket connection diagrams of external auger, flue gas fan and boiler. It is important that plug has to be pushed completely into outlet. Sides will be fixed with plastic stud.

Notice! All electrical connections of the burner must be made by a qualified professional.

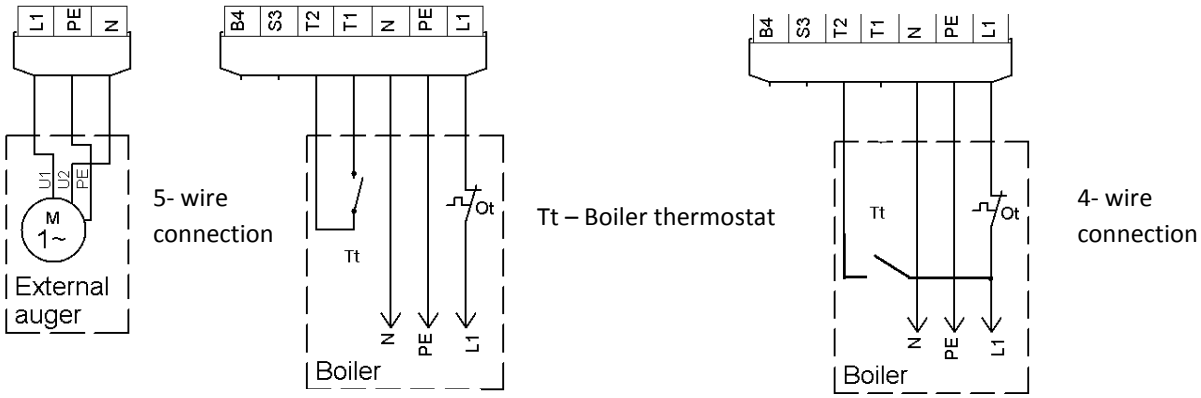


Figure 12 Thermostat connections

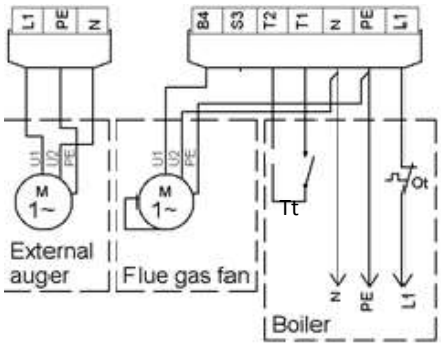


Figure 13 Socket connections

2.5 Initial start up

Prior the initial start-up the burner make sure that:

- The M6 nut that connects burner's housing and burning chamber is securely tightened.
- The neck of burning chamber fits correctly to burner's housing.
- The grate is placed correctly into burning chamber (Figure 14). The back edge of grate has to be against the back wall of burning chamber and fixator stub is inside the chamber.
- Igniter is not stuck behind buring chamber's back wall and its end is on same level with end of its holder tube and does not reach out form it. Igniter can not be in direct touch with pellets and flame.
- Boiler thermostat is installed correctly and functioning properly.
- The boiler thermostat is turned to lowest temperature.
- The external auger is connected to the burner according to Figure 11.
- The smoke duct is connected to the chimney, the dampers for smoke gases are open and sufficient draught exists. When the burner is operating, the negative pressure inside the boiler must stay between 4 and 6 Pa.
- Boiler's air hatches are closed and all air goes thru the boiler.
- Electrical plugs of external auger and boiler on burner's right side are pushed fully into outlets. They should lock with plastic stub clip.

To turn on the burner, switch on boiler's main power switch. If STOPPED is displayed in controllers screen press OK button on user interface and toggle down with the „down" (↓) key to BURNER menu. Then, press OK and „down" (↓) key to toggle from OFF to ON then press OK to approve the change. Press ESC to return to the STATUS display. WAITING is displayed. Now turn the boiler's thermostat to desired temperature. The burner will now go into TESTING mode then LOADING mode. If this is the first

run, the external auger may need up to 20 minutes to load. After the pellets are loaded the burner will go into IGNITION mode then PRE-BURN mode then finally BURNING mode where it will remain until it reaches the temperature by the thermostat. When it reaches this temperature the burner will go into END BURN mode and finally END BLOW until all the pellets coals have extinguished. At that point the burner will be in WAITING mode until the boiler calls for more heat which starts the whole process over again.

To stop the burning, turn the boiler's thermostat down or turn the burner OFF from the BURNER's menu or keep OK button down for 5 seconds.

Caution! Never turn off a working burner from the main power switch of the boiler. Do not leave the burner unattended when it has been necessary to turn off the burner's power while in operation.

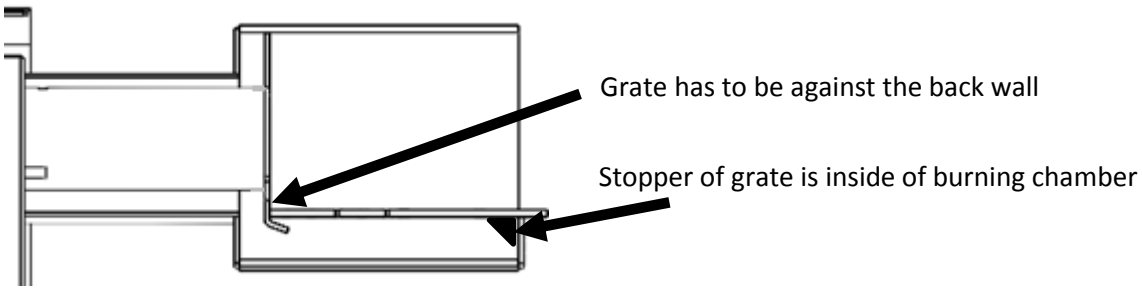
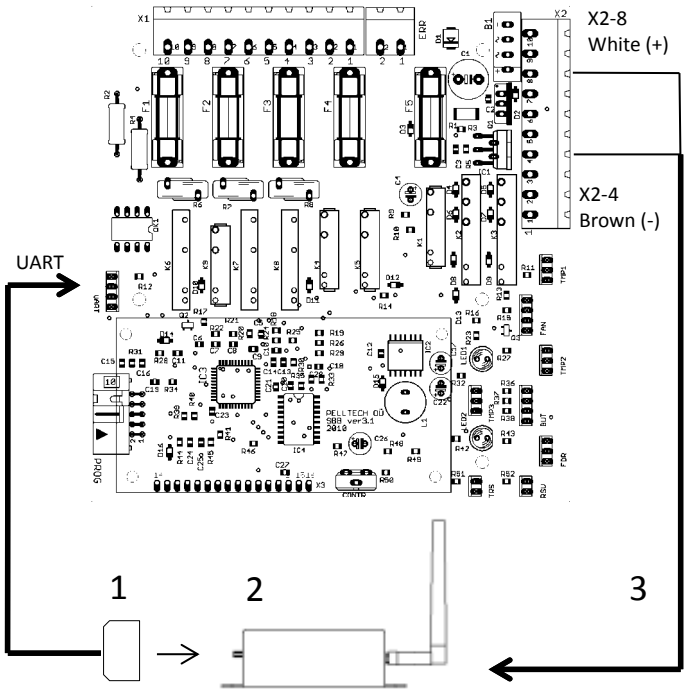


Figure 14 Grate's correct placement

3 Optional components

3.1 GSM modem

GSM modem enables to send burner error SMS messages with 7 last statuses or error message up to 5 phone numbers. If there are more error messages, then less status info rows will be sent by SMS.



Following 3 products are needed to set up modem:

1 – Modem signal converter cable EP0005 to be connected between modem and UART socket

2 – Modem EP0007

3 - Modem power cable EP0001

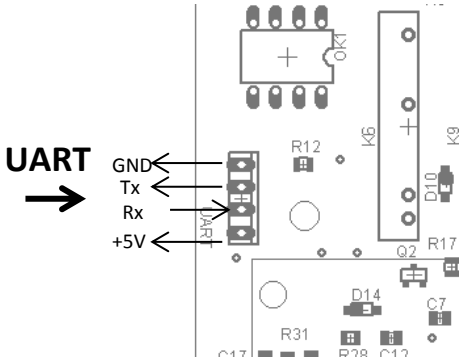


Figure 15 Connecting the modem

Modem (2) is connected according to diagram on Figure 15. Power supply cable's white wire is connected to motors wire (pin X2-8) and brown to X2-4. Adapter EP0005 cable is connected to modem and to controllers UART connector. Depending on the location of the modem, extension cables may be used.

Before inserting the SIM card to modem (Figure 16) following actions have to be done:

1. SIM card has to be activated by the mobile operator.
2. SIM card PIN code reguest must be turned off.
3. Check with mobile phone that it is possible to send SMS with this SIM card.
4. In SIM card´s phonebook must be only the numbers, where the error messages from the burner will be sent to.

Figure 16 SIM card insertion

To insert the SIM card modem has to be switched off from supply mains. To insert the card push it into modem's slot as long as click is heard. To remove card it has to be pushed as long as spring pushes card out.

To activate sending messages the PAR52 value has to be changed from 0 to number of phones the error message will be sent. 0 means that no messages will be sent. 2 means that message will be sent to 2 first numbers in SIM card.

Modem has 2 indicators. Green one shows that modem is switched on. Red one shows status of modem.

Description of modem's statuses is described in Table 4.

Table 4 Modem values

Red LED indicator	Modem status
Permanantly on	Sending message (ongoing call)
Fast interrupt sequence (0,5s/ 1s)	Net search/Not registred/ Turning off
Slow interrupt sequence (0,3s/ 3s)	Registred full service
Permanently off	Device is turned off

3.2 Flue gas fan

Usage of flue gas fan improves work of heating system and optimises burning procedure. In order to activate flue gas fan speed control, PAR30 has to be set to value "1". In this case flue gas fan control is proceed by controllers internal air-table, where for every power level certain amount of combustion air is prescribed according to PAR31…PAR36. If select PAR30 "2" , the flue gas fan is switched off. Value "3" and "4" are not applicable in this burner. Value "5" in PAR30 allows controlling fan's speed with under-pressure sensor what is installed to boiler or burner. Flue gas fan follows pre-set underpressure or draft by PAR61. Control starts when pressure gets lower or rises over value set in PAR61. Product code for compact under-pressure sensor is AP0003A. AP0003A sensor is connected to TEMP2 socket. Before implementation the underpressure sensor has to be calibrated. To do that go to INFO menu and check value of ΔP. It has to be close to "0" (-0,3…+0,3). If not go to PAR63 and by changing its value try to get ΔP close to "0".

During calibration burner has to be at WAITING status, all doors and windows of boiler room opened, also boiler's door has to be opened.

3.3 Error output

It is possible to connect additional devices as pump, modem etc to burner which are possible to turn on or off when error occures. Error output's plug is situated in upper part of controller and is marked ERR (Figure 17). Output enables to connect to circuit up to 5A 230V devices.
PAR50 in boiler parameters menu determines if the circuit is open or closed during error. Table 5.
ERR output relay on the controller board adds various functions:

Table 5 PAR50 values

PAR50 value	Description
1	Normally open circuit. Only connected in ERROR state
2	Normally closed circuit. Only disconnected in ERROR state
3	Connected circuit in PREBURN, HEATUP, BURN and HOLD FLAME
4	Not used
5	Not used in PV20a/30a

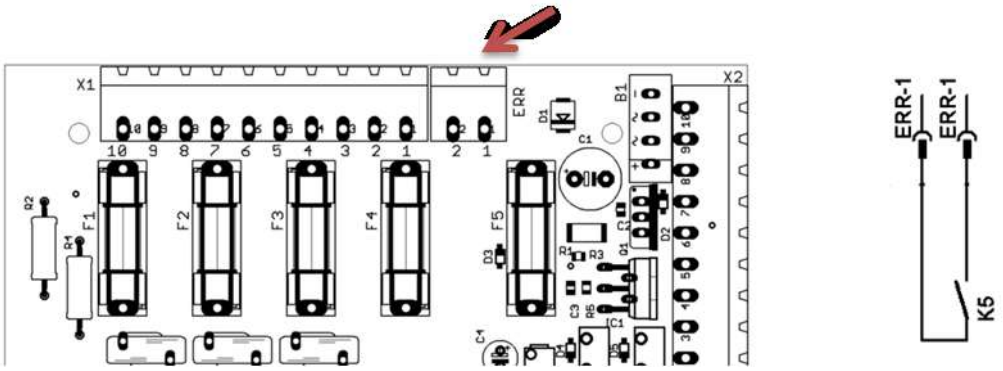


Figure 17 Error output location

3.4 External boiler temperature sensor TMP1

External boiler temperature sensor enables the burner to maintain constant boiler's water temperature. To do that temperature sensor has to be installed to relevant place and connected to controllers plug TMP1. In parameters menu PAR53 value has to be set more than 1.
When temperature holding state is activated, then burner will change its capacity according to water temperature and speed of temperature changing. Burner starts to change its capacity when BURNING status has lasted longer than set in PAR15. Capacity is changed after time set in PAR17.
Following actions must be done to enable temperature hold mode (THM):

1. Mount external temperature sensor to boiler according to boiler manufacturer instructions.
2. Disconnect burners internal overtemperature sensor from controllers TMP1 connector.
3. Connect external sensor to TMP1 connector on controller board.
4. Select PAR53 value "2" (sensor type) according to Table 6.
5. Set required temperature - PAR54. It should be lower than boiler thermostat switch off temperature. Otherwise the boiler thermostat would force the burner to turn off before reaching PAR54 value.
6. Optionally the hysteresis of desired temperature can be changed by PAR55.

THM activates if PAR53 value is more than 1 and BURNING status has lasted longer than set in PAR15 (typically 30min). The burner will change its output power according to currently measured temperature and the rate of temperature change. New power level is selected after time interval specified in PAR17.

Table 6 External temperature sensor types

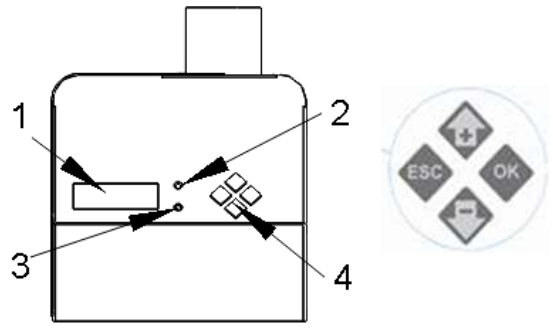
PAR53	Sensor type	Temp min	Temp max	Function
0	No sensor	-	-	-
1	0..2.5V	0ºC (0.5V)	125ºC (1.75V)	Burner's overtemperature sensor (PAR43)
2	0..2.5V	0ºC (0.5V)	125ºC (1.75V)	Boiler's temperature control

After activating THM, following row is displayed on INFO-screen: „T=22.3/70±5↑30°". It means:
22.3 – Actual measured temperature °C
70 – Setpoint temperature (PAR54) °C
±5 – Setpoint hysteresis (PAR55) °C
↑ - Shows if actual temperature is increasing or decreasing
30° – Forecasted temperature after 10min °C

4 Operation and service

4.1 User interface

The burner can be controlled from the front panel on user interface Figure 18. LCD screen (1) displays main menu, set-up menus, info menu and burner's actual statuses and them history. Yellow LED (2) indicates the presence of flame in burning chamber. If yellow LED blinks, the burner is out of normal operation. Green LED (3) indicates existence of fuel in the burner. Last burner's status can be seen on lowest row of STATUS manu. The burner displays two last statuses or error message. To move back in history of statuses push "up" (↑) button. There are 30 last statuses in burners memory together with duration in hours, minutes or seconds. To change parameters use "up" or "down" (↑↓) buttons to enter to desired menu. Confirm entrance with OK. Change with "up" or "down" (↑↓) buttons desired parameter. To confirm the change, press OK. Press ESC button to go back to STATUS menu.The main actions of OK and ESC buttons are described in Table 7.



1. 2-row LCD display.
2. Yellow LED indicates existence of the flame in the burning chamber.
3. Green LED indicates existence of fuel in the burner.
4. User interface control buttons.

Figure 18 User interface front panel

Table 7 User interface buttons

Button	Button's pressing time	Action
OK	Less than 3 seconds	Entering to sub-menu Confirming setting (when blinks)

OK	More than 3 sec	Resetting error status and turning burner ON
OK	More than 3 sec in INFO menu's COUNTER submenu	Resetting pellets counter
OK	More than 3 sec in NO POWER status	Switching burner and battery OFF
ESC	Less than 3 seconds	Moving back in menu. Cancelling setting (when blinks)
OK + ESC	More than 3 seconds	Burner's reset

4.2 Starting and stopping

Starting burner is described more precisely in ch 2.5.

To turn on the burner:

- Turn on the boiler main switch. If burner displays STOPPED, in main menu set BURNER from OFF to ON or
- Press OK button down for 5 seconds.

To stop the burner:

- Turn boiler's thermostat to lowest temperature
- In main menu set BURNER from ON to OFF.

In all cases the burner stops working when all pellets in burning chamber are burnt and turns safely to STOPPED status.

Warning! Never turn off working burner from boilers main switch. Use the boilers thermostate for that. In order to complete burning procedure safely let the burner to burn all fuel in burning chamber. Never leave burner unattended when you had to stop boilers work by turning boiler off from mains switch in any reason.

4.3 Refilling fuel

The fuel container has to be refilled before it runs empty. Fuel can be added at any time during the operation. To add fuel, simply pour a new bag of pellets into your fuel container.

If the container runs empty before new fuel is added, pour more fuel into container and restart the burner from main menu. Starting will take more time because external auger has to be loaded as in initial start up. Turn burner OFF and then ON. Vice verse NO PELLETS is displayed due to exceeded loading time.

4.4 Log description

Log screen STATUS menu displays last and actual events (burner statuses) and their duration. Burner changes its statuses based on received input signals from sensors and parameters set by user.

The duration of all actions is in form mm:ss ("m" in the middle) or hh:mm ("h" in the middle). For example: IGNITING 01m25 means the burner ignition state lasted 1 minute and 25 second.

Lower row of the log shows current state. To reach the lower row, press the "down" (↓) button, until you reach the lower row with current state. The duration of current state updates every second or every minute. Changed data blinks.

Burner statuses are described in Table 8.

Table 8 Burner statuses

Status	Description
STOPPED	Burner is turned off.

WAITING	Burner is turned on and waits for boiler's thermostat switching on. There is no time limits for waiting status. Feeder auger works periodically at WAITING time – ½ rotations after every 2 minutes. When thermostat switches on, burner goes to TESTING.
TESTING	At "Testing" time, burner integrity and important device functioning is checked. Before every startup the burner tests the fan speed, battery voltage and internal feed auger rotation. The fan is powered to its maximum for 10 sec and must see PAR7. If the fan speed doesn't reach PAR7 then FAN ERROR will occur on display. Battery voltage is tested by having the battery power the feeder for one rotation. If the battery voltage drops below 12V then BATTERY LOW error will be indicated. The feeder is tested by having to make 1 rot in 8 seconds, if it fails the FEEDER ERROR will be indicated. Any failure of the above tests will turn off the burner and will require attention.
LOADING	Feeder auger loads correct amount of fuel needed for ignition into burning chamber. Loaded fuel amount is measured by counting feeder auger rotations. Loading is correctly ended when feeder has made PAR24 set rotations. Internal feeder working depends on fuel level sensor: • If level sensor recognizes pellets in burner feed tube for more than 1s, the feeder is started. • If feeder makes 1.5 rotations without fuel in feed tube then the feeder stops. External auger works as need to maintain a constant fuel level in the feeder tube. All external auger loading is dependent on the fuel level sensor: • If level sensor does not recognize fuel in burner more than 1s, the external auger is started. • If level sensor recognizes fuel in burner more than 5s, the external auger is stopped. Normally the start load is accomplished in 5 mins. But, the start loading time can take up to 20 minutes if the external auger was empty. If start load is not accomplished in 20 mins then NO PELLETS will be indicated and the burner will turn off. After the internal auger has made 10 of the 12 rotations the igniter is turned on for preheating. Igniter is switched on for 1 min in order to save its lifetime. At the LOADING time, external auger is holding permanent fuel level in the feeder tube. Depending of the level sensor signal, the auger is turned on or off.
IGNITING	Loaded amount of pellets are in the burning chamber, igniter and fan are working till photocell recognizes the flame. In ignition status igniter heats up, fan starts to blow hot air to pellets and they will be ignited. Igniter works cyclically. Igniter is switsched off after every 50 seconds to avoid it's overheating. Igniter is turned on again after 20s (normal ignition) or 10s (fast ignition). In ignition mode the igniter continues and the fan blows hot air at PAR8 set rps over the loaded pellets and ignites them.If the igniter is turned on for 2m 30sec without flame detection then the igniter will cycle to 10 seconds off and 50 seconds on to avoid igniter damage. If no flame is detected for 9m 30 sec then the burner will indicate an IGN.ERROR and turn off.
LOADING 2	If no flame is detected after 5min 30 sec into the ignition mode second small load- set PAR25 of pellets is delivered into the burn chamber in a final attempt to achieve ignition. If flame is not detected after 9 min 30 seconds into the ignition mode the burner will transition end burn and turn off and the display will indicate an IGN.ERROR.

PRE-BURN	The purpose of preburn mode is to fully ignite the pellets that were loaded for ignition. Pre burn has 1-4 cycles (PAR 42) of 30-80seconds (PAR 41) each. No fuel is added during the first cycle but ½ a rot of feeder auger is added between the following feeder. During the pre-burn cycle the fan continues to work at the same rps as in ignition mode (PAR8).
BURNING	This is main operation status in burner operation.Burner can operate on 11 different power levels. There is 6 main power levels, which can be selected and adjusted and 5 virtual power levels between main levels that can't be adjusted or selected. For every power level fan speed is fixed in parameters 1...6. The fan speed for virtual levels are calculated as average from previous and next main level speed. External auger is holding permanent fuel level in the feeder tube during BURNING state. The auger is controlled by fuel level sensor in following manner: • External auger is started after level sensor does not recognize fuel in burner and internal feeder has done 2 rotations. • External auger is stopped when level sensor recognize fuel in burner for more than 1s. Pellet level in vertical feeder tube is detected by optical fuel level sensor. Fuel is detected when pellets interrupt optical link between sensor pair. It is very important that these optical sensors get cleaned routinely. If not, the pellet dust will trick the sensors into thinking pellets are present in the feed tube when they are not and you will get LEVEL ERROR and NO FLAME errors. Burner will enter level detection fault condition in following cases: 1. Fuel loading timeout (no signal for specified period of time) 2. Fuel unloading timeout (signal lasts longer than specified period of time)
HOLD FLAME	"Hold flame" mode purpose is avoid burner start-up procedures when BURNING cycle is much longer than WAITING status. In HOLD FLAME mode, minimum fuel and air amount is delivered into burning chamber. HOLD FLAME mode can be switched from burner main menu to ON, OFF or AUTO. When HOLD FLAME is selected as AUTO then burner will turn the mode on or off depending of WAITING time: - If WAITING (time between END BLOW and thermostat ON) is shorter than set PAR11, then HOLD FLAME mode is switched on. - if HOLD FLAME is longer than set in PAR12, HOLD FLAME mode is turned off. AUTO status lasts 1 hour and ends with END BURN cycle. In HOLD FLAMEt cycle, burner is fed pellets every 127 seconds and air is blowed as set in PAR10.
END BURN	Boiler has reached an estimated temperature and boiler thermostat has switched off. In the END BURN mode all fuel inside the burning chamber and feeder tube is burned - no more fuel is added from external auger. The feeder auger and fan continue working as in previous mode (HOLD FLAME or BURNING).
END BLOW	In END BLOW mode only the fan keeps working PAR9 until all the pellet coals are burned out. This mode lasts until no flame is recognized for one minute then the burner returns to WAITING mode until boilers thermostat switches on.
NO PELLETS	Level sensor does not detect pellets in 5 or 20 minutes after LOADING. Level sensor does not detect pellets in 4 minutes at BURNING time.
NO FLAME	There is no flame in the burner more than 120 seconds during BURNING.
FLAME ERROR	Flame doesn't disappear in END BLOW TIME set in PAR27.
OVERHEAT	Temperature in the burner has reached temperature set in PAR43 and burner turned itself off.
IGN.ERROR	Flame is not recognized after ignition cycle.

LEVEL ERR	Fuel level sensor displays permanently existence of pellets in input tube.
FEEDER ERR	Feeder auger has not made any rotation in 8 sec at BURNING time. Feeder motor current is reached PAR46 pre-set value.
GRATE ERROR	Existing burners don't have ash removal system. Error is displayed when in PAR99 wrong type of burner is selected. Select PV20a or PV30s depending on real type of burner.
FAN ERROR	Fan doesn't reach 40 rps in 7 sec at testing time with max power. Fan doesn't reach speed according to power level in 20 sec.
NO POWER	Power supply is not detected. Safety thermostate has turned burner out due to overheat or back-burning. Burner works on battery.
BATTERY LOW	Battery is not connected or is empty (>12V) or is out of order.

4.5 Output power levels

Burner has 6 preset output power levels. For every level, program calculates correct fuel amount what depends on fuel's calorific value and burner's internal feeder productivity. The feeder productivity for normal, light and heavy pellets can be changed from main menu. For normal pellets it is 33 gramms per rotation. Calculated amount of fuel is divided into periodic feeding cycles. In every cycle internal feeder makes half rotation. If the calculated cycle comes too short then the cycle length is doubled and fuel is fed with by full rotation of feeder. For every power level there is different preset fan rotation speed. Burner selects the output level between preset min and max powers. When burning time has been more than 30 min (PAR 15), next time burner takes one level up, when burning time has been less than 15 min (PAR 16), next time burner takes one power level down.

4.6 Main menu and settings

To entering to main menu press OK button. Use "up" or "down" buttons to move in menus. Press OK to enter for changing set up values or see burner's information. The existing burners value or info is displayed. To change settings value press OK again. Existing value starts to blink. Using "up" or "down" buttons select new value and confirm the choice by pressing OK. Pressing ESC takes you back to STATUS menu.

Table 9 Main menu

	Menus name	Description	Default settings	Options
1	STATUS	Submenu with status info		
2	INFO->	Burner's info		
3	BURNER	Burner's turning ON/OFF	OFF	ON/OFF
4	HOLD FLAME	Hold flame allowed	OFF	ON/OFF/AUTO
5	PELLETS	Fuel quality options	NORM	NORM/LIGHT/HEAVY
6	POWER	Power level selection	AUTO	PV20 AUTO/10/12/14/16/18/20 PV30 AUTO/15/18/21/24/27/30
7	BASE AIR	Fan speed change at once for all power levels	0	-2/-1/0/+1/+2/+3/+4/+5
8	LANGUAGE	Language options	ENG	*Annex 4 List of languages*
9	PARAMETERS ->	Parameters menu		*Annex 3 List of parameters*

STATUS menu displays last events (burner states) and their duration. All durations are described in form mm:ss ('m' in the middle) or hh:mm ('h' in the middle). For example IGNITING 01m25 means that the burner's ignition state lasted 1minute and 25 seconds. Last row of the log shows current state. All burner's statuses are described in Table 8.

INFO menu displays main burner's indicators like:

- Battery voltage: U=13V64 i.e. 13,64V when feeder motor works
- Feeder auger motor's current: I=2,0 A
- Firmware version and date: ver=3.88 31.10.13
- Total amount of pellets burnt: Total= kg (reset when firmware upgraded)
- Interim amount of pellets burnt: Count= kg (reset from INFO menu press OK > 3 sec)
- Selected and max power level : P= 10/20 kW (selected from POWER menu)
- Burners temperature: T=23^{o}
- Fan's speed: F= F=28/38± 2 0/35 rps (28 actual speed of primary fan, 38 set-up speed of primary fan, ± 2 base air value, 0/35 same for secondary fan)
- Burning chamber's pressure: -128,5 Pa (no used in this models)

Menu **BURNER** enables to turn burner ON or OFF.

The main idea of **HOLD FLAME** function is to reduce burner's permanent on-off cycles. This function is useful if burner's working time is much longer than stand by time. For example 1 hour of working time and 10 minutes of waiting time. In HOLD FLAME state the fan rotates slowly (PAR10) and small quantities of fuel are added to burner. Existence of flame is not checked. Such status lasts max one hour, after what burner ends usual cycle and stays WAITING. If boiler's thermostat switches on before one hour, then burner goes to BURNING to state. If HOLD FLAME is set to AUTO, then it activates when two stand-by times have been shorter than set in PAR11. HOLD FLAME turns off if flame has been hold more than set in PAR12.

Menu **PELLETS** enables to select between 3 preset fuel quality options. Depending on fuel quality the weight of pellets and its caloric value may differ in same volume. Normal weight for pellets is 650..670 g/l (650..670 kg/m^3). By default burner calculates that one rotation pushes 33 gramms pellets (PAR21) to burning chamber. If pellets density is smaller i.e they are lighter (less than 600 g/l), then with one rotation less pellets will be delivered into burning chamber. Such mistake may to be compensated by selecting LIGHT from PELLETS menu. Now burner calculates that one rotation equals with 31 gramms of pellets (PAR22) and makes more rotations and delivers more pellets into burning chamber. If pellets are heavier than normal (more than 700g/l) HEAVY has to be selected in PELLETS menu. Now burner calculates that 35 g of pellets is delivered with one rotation to burning chamber and delivers fewer pellets into burning chamber. In general case there is no need to make changes in PELLETS menu. Weight of pellets can be manually changed in PAR21..PAR23.

Menu **POWER** determines caloric productivity of burner in kilowatts. Power is calculated by reading the rotations of the feeder auger, taking into account average caloric value of 1 kg of pellets. It is possible to preset particular (14; 16; or else) power level value or AUTO - automaticly selected value. In AUTO status burner selects necesary power level depending on time what is needed to achieve preset temperature. Burner changes its capasity what is determined by parameters MIN POWER(PAR13) and MAX POWER (PAR14). If burner cannot achieve preset temperature in certain time (PAR15) it will rise its power automaticaly by one level and continues rising power up to reaching maksimum level (PAR14) or boiler has achieved preset temperature.

If boiler achieves preset temperature faster than set in PAR16 burner will work one power level lower in next cycle. Power will be reduced as long as burner has reached minimal power level (PAR13).

Menu **BASE AIR** changes speed of fan in all power levels by same number. It is reasonable to use base air to compensate different characters of particular heating systems. For example if draught in boiler is very strong the fan may utilise to work with lower rotations in base air negative value (-2Pa).

Menu **LANGUAGE** enables user to select between 17 languages. Table of languages is in Annex 4.

Menu **PARAMETERS** gives overview of burner's default, min and max settings. The menu enables fine tuning of the particular burner. In general it is not neccesary. Short description of parameters is given in Annex 3.

4.7 Regular maintenance

Pellet burners burning chamber requires regular maintenance. The maintenance period depends on the quality of the pellets and heating intensity. The average maintenance period is one week. The burning chamber needs cleaning if ash layer on grate is thicker than 1,5 – 2 cm. If there is more ash on the grate then it directs flame up directly against the burning chamber and burns a hole into it quite fast. That makes burners work ineffective. If ash gets under the grate then it closes air channels, grate heats over and gets deformed (Photo 1). That reduces critically burning quality. As even superior quality pellets contain 0,3 -0,5 % ash, then the **grate has to be cleaned at least once a week.** Depending on the quality of the pellets, it might be necessary to clean the burner more frequently. Lower quality pellets contain more ash and nonburning substantces. See Photo 1 . Well cleaned burning chamber of burner reduces fuel consumption and increases substantially its lifetime.

Only high quality pellets e.g. ENPlus-A1 (Premium) can be used in PV20a/30d burners.

Photo 1 Burned-out burning chamber and defrormed grate

Photo 2 Ash of low quality pellets

In order to clean burning chamber:

1. Turn burner off by turning thermostat to zero
2. Let boiler cool down at least one hour.
3. Open boilrer's door to reach the burning chamber
4. Remove grate and clean it properly. Be sure that all holes are clean.
5. Remove ash and residues.
6. Clean boiler. Cleaning frequency of boiler depends on its type and intensity of heating. See more information of boilers cleaning from manual.
7. Place grate back to burning chamber. Grate has to be in right position and its stopper has to be inside the burning chamber. See Figure 14. The stopper has to hold grate surely in it place. Wrongly placed grate changer air supply and reduces efficiency of burning. Only air needed for burning has to get under the grate. The grate of PV20 has not be replaced with grate of PV30.
8. To finish the cleaning close boilers door and turn thermostat to wished temperature.

The boiler has to be cleaned from collected ash and burning residues. Manufacturer of pellet burners don't prescribe time period of cleanings.

BOILER HAS TO BE CLEANED FROM ASH AND NON-BURNING RESUDUES BEFORE THEY GET TOUCHED WITH BURNERS BURNING CHAMBER. The ash and non-burning residues are perfect heat insulators. If burning chamber is surrounded with ash and non-burning residues so its normal ventilation is distracted. It causes fast overheating and out-burning or deformation of the burning chamber.

WARNING! DEFORMATION AND OUT-BURNING OF BURNING CHAMBER CAUSED BY NOT-IN- TIME MADE CLEANING IS NOT MANUFACTURERS DEFECT AND IS NOT WARRANTY OBJECT.

Notice! From time to time the pellets container has to be cleaned from saw dust collected. If there is too much saw dust collected, the external auger can't reach pellets and NO PELLETS error message is diasplayed.

4.8 Replacing components

It is recommended to turn to a specialist for replacing the components, except when replacing the igniter.

Warning! Remove the burner from power circuit before opening the burner's case and replacing the components.

Warning! Follow always polarity when connecting battery. In case the battery is wrongly reconnected, it will ruin the controller and it is dangerous to the person.

Warning! Connect burner to mains only if first panel is rised up and fixated with screw. It is against danger caused by incorrect connecting battery polarity.

Warning! Connect the burner to the power circuit only if the burner's front case is in lift-up position and attached with a screw. It is a safety measure against the danger in case the battery is connected in the wrong direction.

Notice! If you find that replacing components may turn out too complicated to you, it is recomended to appeal to specialist.

The locations of burner's replacement components are presented on Figure 19.

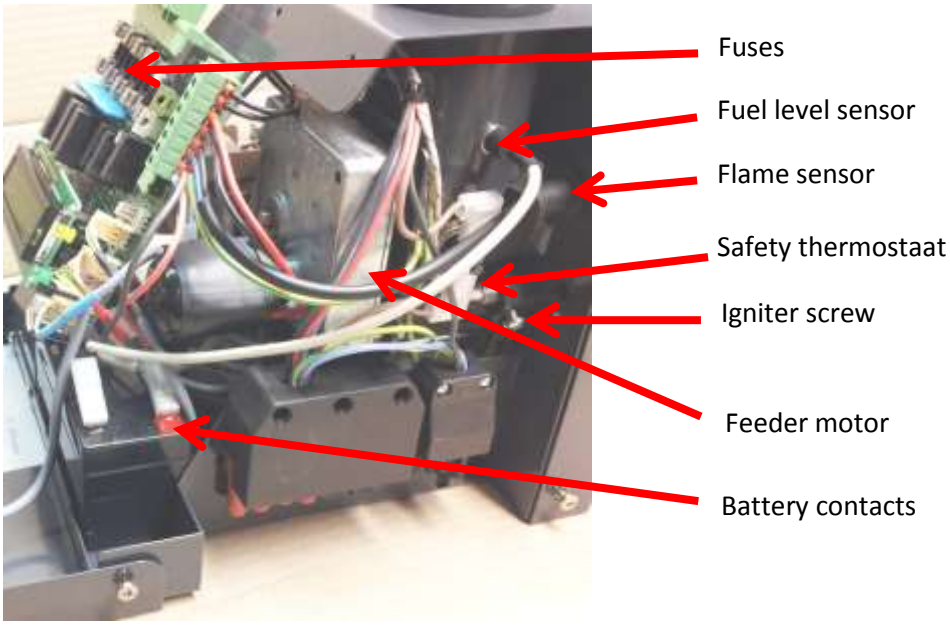


Figure 19 Replacement components

4.8.1 Replacing igniter

For replacing the igniter a small (2,5 ... 3,5 mm) flat screwdriver in order to connect the wires and a cross-head screwdriver for replacing the igniter are needed.

1. Be sure that burner has cooled down and disconnected from power circuit.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Disconnect igniter's wires from screw connector X1.
4. Turn loose the screw that attaches the igniter to its case.
5. Open boilers door to get access to the burning chamber.
6. Press igniter into burning chamber and take it out through the burning chamber.
7. Swirl the wires of the new igniter together and put them through the burning chamber into the socket of igniter.
8. Push the igniter so deep into its case that the igniter's end would be on the same level with burning chamber's rear wall.
   Caution! If igniter is out of its opening, then it will get to contact directly with pellets and flame. In that case iginiter burns out very quickly.
9. Tighten the fixing screw again and make sure that the igniter's other end would not be in touch with the rear wall of the burning chamber.
10. Reconnect the wires back to connector X1 terminals 1 and 2.. The order is not important. Screw terminal must be tightened so hard that when pulling the wires, they would not come out from under the screw.

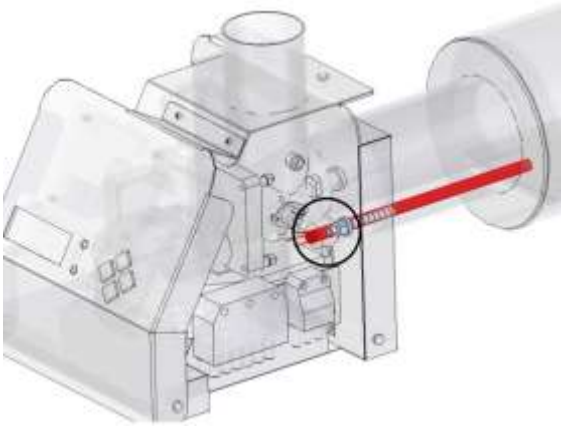


Figure 20 Placement of igniter

4.8.2 Resetting safety thermostate

Warning! To reset safety thermostate burner has to be disconnected from power circuit**.**

When burner is overheated the safety thermostate turns it off. Overheating may arise when draught in boiler is in wrong direction and pellets start the back- burning in feeder auger.

Thermostat is located on the horizontal tube of feeder auger Figure 19.

In case of overheating the burner flashes yellow indicator and displays message OVERHEAT.

The safety thermostat with button has to be reset manually:

1. Make sure the burner has cooled down and disconnected from power supply.
2. Remove burner's red cover by loosening 4 screws, 2 on both sides. See Figure 7.
3. Press small button on thermostat (Figure 21). Place cover back.
4. Connect supply mains.
5. Press OK for 5s and burner should start to work.
6. If flame indicator keeps on flashing and fuse F5 is well, replacement of thermostat is needed.

If mains supply returns the message NO POWER remains in screen. Restart burner by holding OK and ESC buttons down more than 3 seconds.

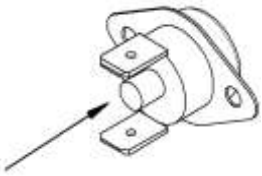


Figure 21 Safety thermostat

4.8.3 Replacing fuses

Burner's controller is protected against the errors of external devices with electrical fuses. Fuses may burn out in case e.g. foreign object gets into the fan or motor and blocks their work.

Fuses are located in the upper side of the controller's plate and are labeled as F1...F5.

Replacing:

1. Make sure the burner is removed from power circuit.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Remove the fuse and check its' state with a tester or looking it against the light.
4. Replace the fuse with an equivalent one if necessary. The plastic cover of the fuse holder must be placed back directly not obliquely. Otherwise the cover might push the contacts far from each other and break the connection.

5. In case the fuse burns out again, the component which is connected to the fuse probably needs replacing.

Table 10 Fuse values

Fuse	Value	Function
F1	0,5A (500mA)	External auger
F2	1A	Fan
F3	1A	Flue gas fan
F4	3A	Igniter
F5	2A	Controller and feeder auger motor

4.8.4 Replacing fuel level sensors

The fuel level sensor consists of an optical transmitter and receiver which are aligned on either side of the vertical part of the feed screw's tube. Figure 1 pos 11.

The typical problem of the level sensor is getting dirty. Try cleaning them before replacing the sensor. While cleaning it should be considered that the lenses of the sensors are made from plastic and they should not be scratched or made mat any other way. The lens is getting dirty if there is no draught and the flue gas moves along the feed screw back to the burner. The soot and heat of the flue gas covers the surface of the sensor with an opaque layer. Sensors should not be replaced before you are absolutely sure that LEVEL ERROR is caused by sensors. Pellets falling into burner's inlet tube shall clean sensors enough. Sensors cleaned too often without direct need will get damaged sooner.

If the lens cannot be reached inside the tube, the sensor may be turned out.

Replacement:

1. Make sure that burner is removed from supply mains.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Disconnect sensors from controller and and turn the sensors out from the tube.
4. Install new sensors and follow while connecting cables: TRS is black sensor and RSV is white sensor.
5. Place back burners cover and connect burnet to supply mains.

4.8.5 Replacing flame sensor

The flame sensor may get dirty or melt during back-burning. The flame sensor consists of light reactive resistors and protective plastic case which is transparent from the end. The case in turn is in a socket made of black rubber. For replacing the sensor a small (2, 5 ... 3, 5 mm) flat screwdriver is needed for connecting the wires.

For checking and replacing:

1. Make sure that burner is disconnected from mains supply.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Pull the sensor out of the burner and clean it's transparent part with soft cloth and alcohol.
4. In case the sensor has melted disconnect wires from connector X2 and replace the sensor.
5. The connection order of sensor's wires is not important. Controller screws must be shut so tightly that the wire does not come out from underneath the screw when the wire is pulled.
6. Place back burners cover and connect burner to mains supply.

4.8.6 Replacing fan

The air in boiler room contains dust that can deposit on fan bearings. The best cure is to keep boiler room as clean as possible. Otherwise the fan bearings get stuck after several years of working and must be replaced. For replacement small flat screwdriver (2,5…3,5mm) and at least 18 mm tall crosshead screwdriver (preferably with magnetic tip) are needed.

1. Make sure that burner is disconnected from mains supply.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Disconnect gray and blue wire from fan and control cable from FAN socket on controller board.
4. Remove the rest of the plugs attached to the controller. Green plugs must be pulled out in parallel direction of the plate.
5. Remove the tin attaching the controller that prevents the access to the fan. Two tin screws from the lower edge of the burner and one screw on top of the burner must be turned loose in order to do that.
6. For accessing the screws of the fan, removing or shifting the battery is necessary. The battery is attached to the bottom with a double-sided tape.
   Warning! If possible, do not remove the battery contacts because in case of wrong assembling the controller will be ruined and it is dangerous for the person.
7. Turn loose the four screws folding the fan and replace fan.
8. Place back the battery and controller with the tin. Chart inside the burner's front cover facilitates connecting the sensors.
9. Reconnect fan's control cable to FAN socket and the rest of the plugs.
10. Reconnect gray and blue wires with the fan.

4.8.7 Replacing feeder auger motor

The condition of the feeder auger's motor is crucial for safety. Failed feeder auger motor may cause back-burning. Therefore the motor must be replaced after every 2000 working hours or after 30 tons of pellets are burned or when the burner gives warning FEEDER ERR. Roughtly calculated amount of pellets burnt (in kg) is accessible from INFO menu.

To replace the motor the spiral of feeder auger has to be removed and 4 nuts fixating motor unrolled. To do that tall 4 mm hex wrench, spanner no. 8, small 2,5..3 mm flat screwdriver and tall tweezers to remount the metal bushing are needed.

1. Remove the fan and tin what holds controller. See 4.8.6
2. In order to remove the spiral, the screw connecting the spiral and motor must be seen from the top of inlet tube. If screw is not seen the shaft of motor has to turned. Disconnect motors wires 7 and 8 from terminal X2 (See Annex 1 Table 12) and touch the battery inside the burner's case with wire ends until the screw of the spiral is in approachable position. The motor can be connected to the battery from both sides.
   Warning! Do not remove battery contacts because in case of wrong assembling the burner's controller will be ruined.
3. Turn loose spiral's hex screw (4 mm hex wrench) and pull spiral out. Don't remove screw!
4. Turn out the four nuts that are keeping the motor attached to the casing. Pay attention that the nut was not tightened to rubber bunt.
5. Remove the motor. The motor rests on the rubber bunts and therefore the removal of the motor some applied force is necessary.
6. Place the new motor.
7. Screw back the four nuts. Nuts must be tightened only until they are at the end of the thread with their total length. Nuts must not be tightened to the rubber bunts. It reduces the lifetime of the motor and increases the burner's working noise.Touch battery with motor wires as long as oblate part on motor's shaft is seen from above of feeder's tube.
8. Touch battery with motor wires as long as motors shaft has turned to approachable position.
9. By using tall tweezers place metallic bushing back to feeder motors shaft.

10. Mount spiral back to motors shaft and fixate it with screw (4mm hex wrench). Spiral must stay cluck but it must not come off from the motor when pulled strong.
11. Reconnect motors wires to connector X2. Correct placing of wires is given in Annex 1.

4.8.8 Replacing battery

When multiple power failures have occurred recently, the battery may be just empty. In that case the battery just needs to recharge and replacing the battery is not necessary.
Battery must be replaced when the burner gives BATTERY LOW message even though it has been recharged or after 5 years. As the battery is also safety device, burner monitors the state of battery and blocks next work cycle if battery voltage is not within limits.
To replace battery:

1. Make sure that burner is disconnected from mains supply.
2. Remove burner's red cover by loosening 4 screws (2 on both sides). See Figure 7.
3. Push the battery to remove it from burners housing. Battery is fixated to housing with double sided tape.
4. Remove the wires from the battery.
5. Replace battery and fix it to base with new double sided tape.
6. Reconnect battery wires.

Warning! Red wire goes together with the red battery contact and black wire goes with black contact. Wrong assembly of the battery will ruin the controller.

5 Status change logics

Table 11 Status change logics

Status	Next Status	Change conditions
WAITING	TESTING	Boiler thermostat switches on.
TESTING	LOADING	All tests are done successfully.
	BATTERY LOW	Battery voltage is below 12V.
	FAN ERROR	Fan does not reach 40 rps at PRE-BURN.
	FEEDER ERROR	Feeder in not able to make 1 rot in 8 seconds
	LEVEL ERROR	The level sensor recognizes pellets in the feeder inlet.
LOADING	IGNITING	Loading rotations (PAR24) made by feeder.
	FAN ERROR	Fan speed does not reach 35 rps.
	NO PELLETS	Maximum loading time (5 min. normal or 20 min. manual start) is reached.
	END BURN	Flame detected but unknown start conditions. LOADING again.
IGNITING	PRE-BURN	Flame recognized.
	LOADING 2	Max ignition time (255 sec.) is reached and load 2 is not done.
	IGN. ERROR	Max ignition time (255 sec.) is reached and load 2 is done.
LOADING 2	IGNITING	Previous state was IGNITING, feeder made 3 rotations (PAR25) .
	PRE-BURN	Previous state was HOLD FLAME, feeder made 3 rot.
PRE-BURN	BURNING	Max pre-burn time (PAR41) is reached and flame is continuously recognized more then 5 seconds.
	LOADING 2	Max pre-burn time (PAR41) is reached, no flame detected and LOADING 2 is not done.
	FLAME ERROR	Max pre-burn time (PAR41) is reached, no flame detected and LOADING 2 is done.
BURNING	END BURN	No signal from boiler thermostat (HOLD FLAME is OFF in main menu).

	HOLD FLAME	No signal from boiler thermostat (HOLD FLAME is ON or AUTO in main menu).
	END BURN	Maximum burning time (4 hours) is reached.
	END BURN -> END BLOW ->LEVEL ERROR	After 8 rot of feeder pellets are continuously detected in feeders inlet.
	END BURN -> END BLOW ->NO PELLETS	Fuel level is not detected in feeders inlet in 4 min.
	FLAME ERROR	Flame is not recognised more than 2 minutes.
HOLD FLAME	BURNING	Boiler's thermostat has switcheds on.
	END BURN	Max HOLD FLAME time (PAR12) is reached.
END BURN	END BLOW	End of burning. Feerder made 15* rot. + 10rot. Plus blow time 30sec. is reached.
	BURNING	Boiler's thermostate has switched on, feeder has made less than 8 rot and previous state was BURNING.
END BLOW	WAITING	No flame more than 1 min. and boiler thermostat is switched on.
	STOPPED	No flame more than 1 min. and boiler thermostat is switched off.
	LEVEL ERROR	No flame more than 1 min. Error from: BURN-> END BURN-> END BLOW>LEVEL ERROR.
	NO PELLETS	No flame more than 1 min. Error from: BURN-> END BURN-> END BLOW->NO PELLETS.
NO POWER	WAITING	Main supply exists and boilers thermostat is swtiched on.
	STOPPED	Main supply exists and boilers thermostat is swtiched off.
	BURNING	If BURNING was before NO POWER and less than 15 min in NO POWER.
Any other	WAITING	Boilers thermostat is switched on.

6 Status durations

Table 12 Status' durations

State	External auger	Feeder auger	Fan	Igniter
WAITING	-	½ rot / 127s	-	-
TESTING	-	2 rot	Maximum /10s	-
LOADING	By fuel level	PAR24	-	30...60 s
LOADING 2	-	PAR25	PAR8	-
IGNITING	-	-	PAR8	30/20 s
PREBURN	-	-	PAR8	-
BURNING	By fuel level	By power level	PAR1..PAR6	-
HOLD FLAME	By fuel level	½ rot / 127s	PAR10	-
END BURN	-	By power level	PAR1..PAR6	-
END BLOW	-	-	PAR9	-
STOPPED	-	½ rot / 127s	-	-
NO PELLETS	-	½ rot / 127s	-	-
FLAME ERROR	-	½ rot / 127s	-	-
OVERHEAT	-	½ rot / 127s	-	-
IGN. ERROR	-	½ rot / 127s	-	-
LEVEL ERROR	-	½ rot / 127s	-	-
FEEDER ERROR	-	½ rot / 127s	-	-
FAN ERROR	-	½ rot / 127s	-	-
BATTERY LOW	-	½ rot / 127s	-	-
NO POWER	-	½ rot / 127s	-	-

7 Error messages and solutions

Table 13 Error messages on screen

Message in screen	Reason and solution
BATTERY LOW	• Battery voltage is less than 12V with working feeder motor. - If there was a power failure then just wait when it is charged. - Replace battery (4.8.8).
IGN.ERROR	• Flame is not detected at ignition time. - Igniter is out of order or fuse is blown. Usually fuse blows when igniter is broken or its body is in short circuit. Replace igniter or fuse F4 (5.8.1 and 4.8.3). • Igniter's resistance has increased with years. Normal resistance has to be 106…110 Ω. - Replace igniter (5.8.1). • Flame sensor is dirty or is melt. - Clean or replace sensor if needed (4.8.5). • Amount of pellets for igniting is too small. - If error is frequent, increase amount of pellets PAR24.
STOPPED	• Burner is turned OFF from main menu. - To turn burner on hold OK button down 3 seconds or change in BURNER menu OFF to ON
LEVEL ERROR	• Feeder auger doesn't rotate. - Remove plastic hose and check is there any foreign object or very long pellet jammed the feeder auger. Remove obstacle. • Fuel level sensor displays permanently existence of pellets in feeder's tube. - Level sensors are dirty or melt. Clean or replace sensors if needed (4.8.4). • Poor draught made sensors dirty. - Check sensor, clean if needed. Improve draught.

NO PELLETS	• Max loading time is reached, but level sensor hasn't detected enough fuel in feeder within 4 minutes in BURNING state or 5 minutes in LOADING state or 20 minutes after manual or initial start. - No pellets in container. Check existence of pellets, refill container. - External auger is out of order. Check fuse F1, check cable plug connection with burner. Replace fuse F1 or auger (4.8.3. and 4.8.7). - Fuel level sensor is broken or short. In this case transparent tube has to be filled with pellets. Replace sensor (4.8.4). • Level sensord do not detect pellets. - There might be too much sawdust in container and external auger can't reach the pellets. Remove sawdust.
NO FLAME	• Flame is disappeared more than 120 seconds at PRE-BURN or at BURNING time. - Fuel level sensor is dirty or broken. Check sensor, clean or replace if needed (4.8.4). - Flame sensor is dirty or smelt. Clean or replace sensor (4.8.5**).**
FLAME ERROR	• In BURNING state within 1 minute flame sensor has not recognised the flame. - Too many pellets in burning chamber are extinguished flame. • Flame sensors are dirty or melt. - Clean or replace sensors (4.8.5) • Flame doesn't disappear in END BURN status within 6 minutes. - Too many unburnt pellets in burning chamber.
SRP	• Appears in screen for some seconds when turning on the burner. - If message doesn't dissapear press any button on the front panel.
FEEDER ERROR	• Feeder auger has not made any rotations in 8 seconds at its running time. - Feeder auger motor's rotation sensor is too far from magnet. Check sensor's placement. Adapt placement if needed. Sensor has to be located 2...3mm far from magnet on motor's axis and has to be possibly on the magnet. At same time it must not to touch motor's rotating parts. - Feeder auger motor's reductor may be broken (if motor makes noise). Replace both. - Feeder auger motor current has reached its limit and over-current protection applied. - Feeder auger may be blocked or jammed by foreign object. Remove obstacle.
FAN ERROR	• Fan has not reached enough speed at testing time. - Fan motor's rotation sensor is too far from magnet. Check sensor's placement. Adapt placement if needed. Sensor has to be located 2...3mm far from magnet on motor's axis and has to be possibly on the magnet. At same time it must not to touch motor's rotating parts. - Fan doesn't rotate. Bearings too dusty or fuse F2 is blown. Clean bearings or replace fan. Replace fuse (4.8.3).
NO POWER	• The mains supply doesn't reach controller. - Due to back-burning safety thermostate has turned mains off. Reset thermostat (4.8.2). - General blackout. Wait for its end. Restart burner by holding OK button down 3 seconds or changing in main menu BURNER from OFF to ON.
OVERHEAT	• Temperature in the burner has reached in PAR43 pre-set temperature and burner turned itself off. - Possible back-burning caused by insufficent entrance of fresh air into the boiler room or draugh to wrong direction. Ensure availability of fresh air and improve draught. - Bad connection of temperature sensor. Check and improve connection.
GRATE ERROR	• Existing burners don't have ash removal system. - Error is displayed when in PAR99 wrong type of burner is selected. Select PV20a or PV30s depending on real type of burner.
Empty screen, backlights on	• Controller error or screen error. - Replace respective component. • The contrast of screen is poor. - Contrast can be adjusted with small screwdriver by turning the resistor CONTR on down

	edge of controller. In one extreme the screen displays nothing and in other extreme screen is filled with black retangles.
Empty screen, no backlights	• No mains supply. - Safety thermostate turned burner off due to backburn (pt 5.8.2). Reset thermostate. - Fuse F5 is blown (only for controller SBB ver3.2). Replace fuse (4.8.3).

If error appears the burner is switched off and text of error is displayed in screen of user interface. In order to start burner the error message has to be canceled i.e. burner restarted. For that keep OK button down for 3 seconds or go to main menu and in BURNER menu change OFF to ON.

8 Annex 1 Electrical diagram

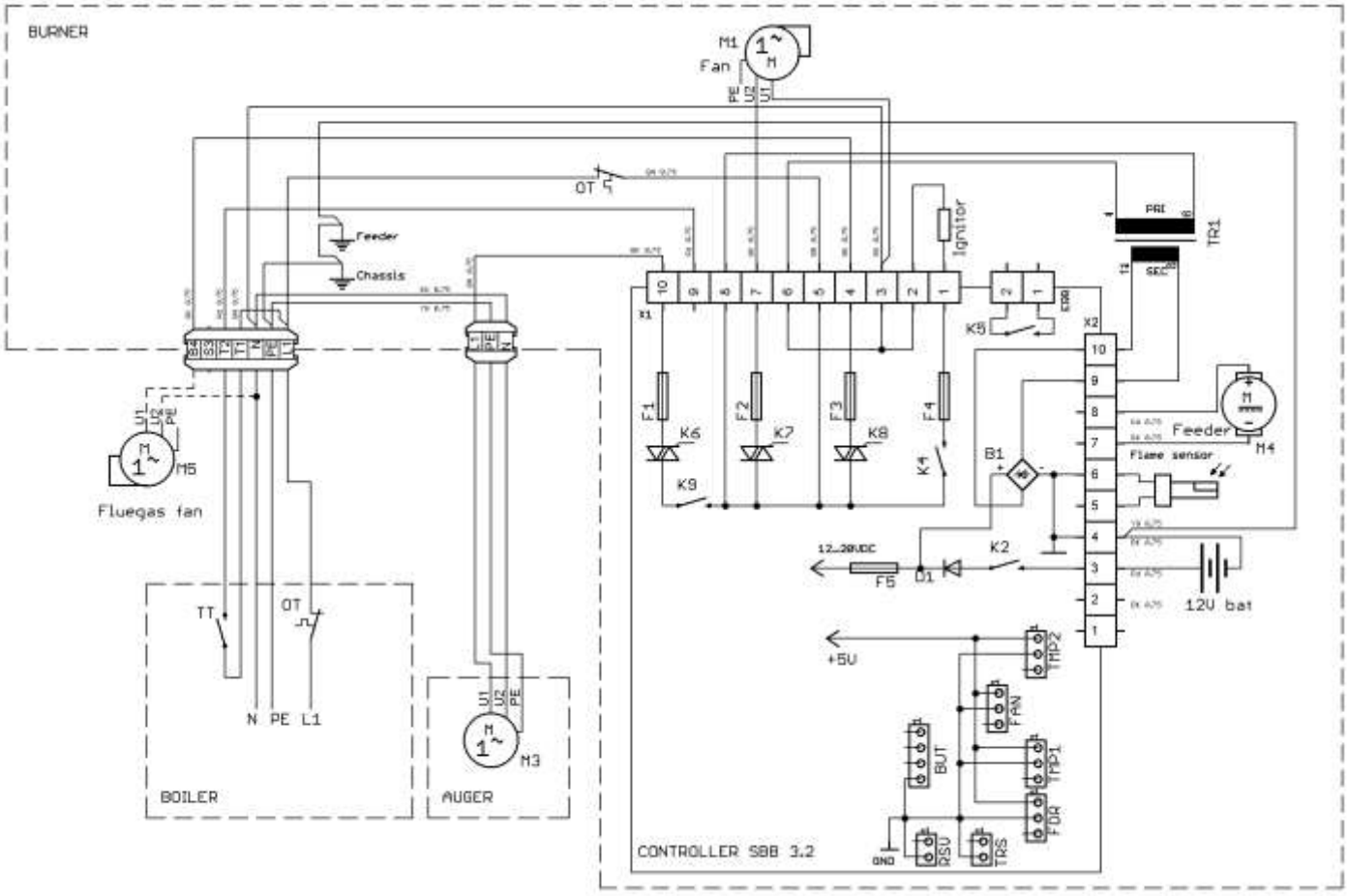


Figure 22 Burner's electrical diagram

SBB - Controller
Chassis – Earthing terminal of housing
M1 – Fan motor
M3 – External auger motor Linear drive motor
X1, X2 – connector terminals
TR1 - Transformer
Bat – 12V battery
RSV – Fuel level receiver

M4 – Feeder motor
M5[1] – Flue gas fan
F1…F5 - Fuses
UART – Modem connector
BUT – Control button connector
FAN – Fan control connector
R1 - Igniter

TRS – Fuel level transmitter
FDR – Feeder augers control
TMP1 – Internal or external temperature sensor
TMP2 – Option low pressure sensor
R2 – Flame sensor
K5 – Error output
Ot – Safety thermostats
Tt – Boiler's thermostat

[1] Flue gas fan M5 will be installed in case when draught in boiler is not sufficient. Fuel gas fan doesn't include in burner's set and it's price doesn't include in burner's price.

9 Annex 2 Controller SBB 3.2

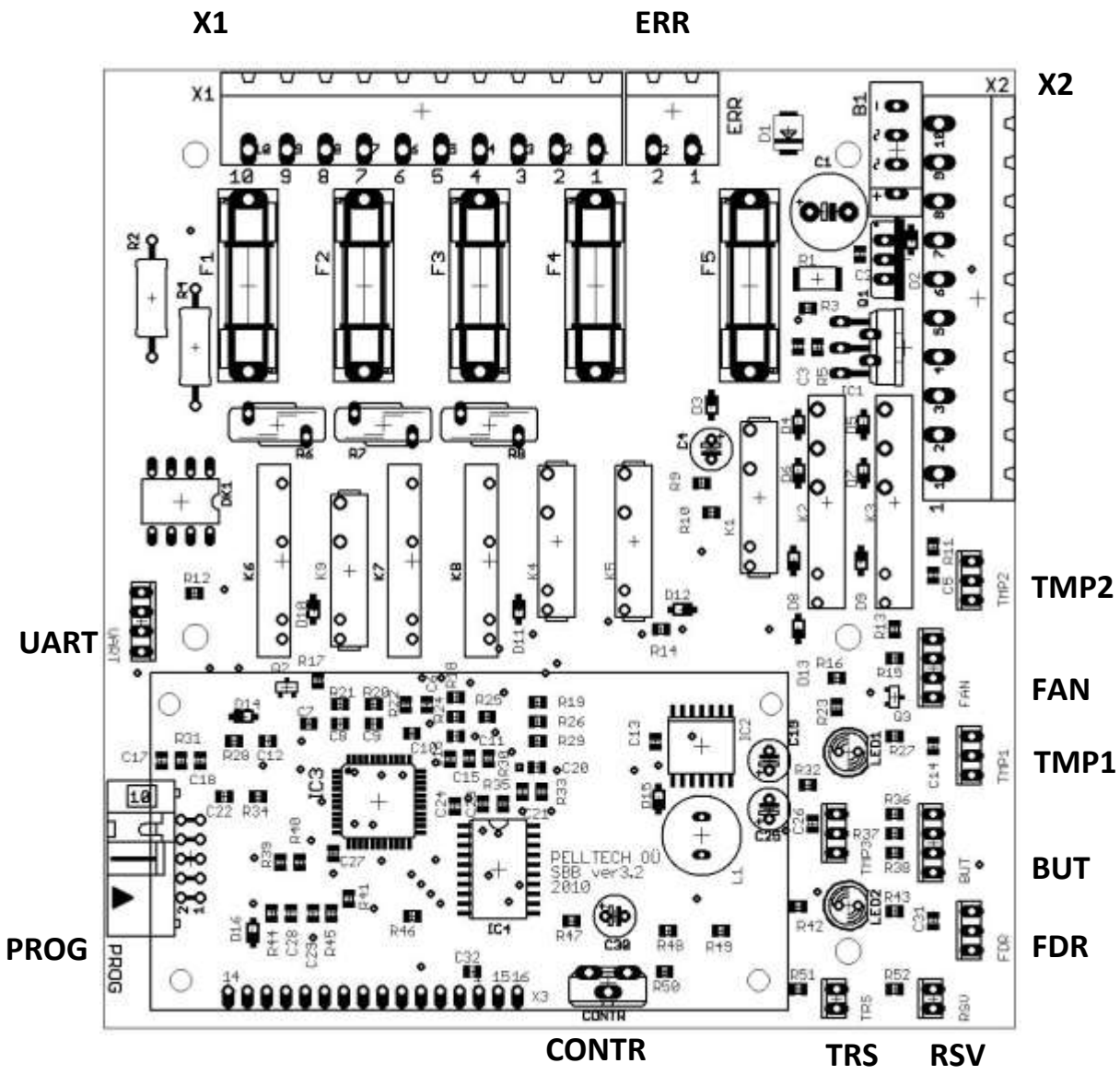


Figure 23 Controller SBB 3.2

X1 – 230V connector terminal
ERR – Error output
X2 – 12 V connector terminal
TMP1 – Feeder auger temperature sensor
FAN – Fans rotation sensor
TMP2 – Not in use
TMP3 – Not in usel
BUT – Control button connector

RSV – Fuel level sensor's signal receiver (white marked)
TRS – Fuel level sensor's signal transmitter (black marked)
CONTR – LCD contrast adjustments
PROG – Programming outlet
UART – RS232 Modem connector

Table 14 Connectors X1 and X2

X1	Description	X2	Description
1	Igniter	**1**	-
2	Igniter	**2**	-
3	N – Supply mains	**3**	Battery's "+ " terminal (red)
4	Flue gas fan	**4**	Battery's "-" terminal (black)
5	L1 – Supply mains	**5**	Flame sensor
6	Transformer 's primary winding	**6**	Flame sensor
7	Fan	**7**	Feeder auger's "-" (black)
8	Transformer 's primary winding	**8**	Feeder auger's „+" (red)
9	Boiler thermostat	**9**	Transformer's secondary winding
10	External auger	**10**	Transformer's secondary winding

10 Annex 3 Table of parameters

		Vers 3.88.9		PV20a/20b			PV30a/30b		
PAR	**PAR name**	**Description**	**Unit**	**Def**	**Min**	**Max**	**Def**	**Min**	**Max**
PAR1	FAN @10(15)	Fan speed at 1.power level PV20(PV30)	rps	24	22	27	25	23	28
PAR2	FAN @12(18)	Fan speed at 2.power level PV20(PV30)	rps	27	25	30	28	26	31
PAR3	FAN @14(21)	Fan speed at 3.power level PV20(PV30)	rps	29	27	32	30	28	33
PAR4	FAN @16(24)	Fan speed at 4.power level PV20(PV30)	rps	31	29	34	33	31	36
PAR5	FAN @18(27)	Fan speed at 5.power level PV20(PV30)	rps	34	32	37	37	35	40
PAR6	FAN @20(30)	Fan speed at 6.power level PV20(PV30)	rps	38	36	41	42	40	44
PAR7	FAN START	Fan speed at TESTING	%	140	80	240	140	80	240
PAR8	FAN @IGNITING	Fan speed at IGNITING and PRE-BURN	rps	25	20	35	25	20	35
PAR9	FAN @END BURN	Fan speed at END BURN	rps	20	10	40	20	10	40
PAR10	FAN @HOLD FLAME	Fan speed at HOLD FLAME	rps	10	7	14	10	7	14
PAR11	HOLD FLAME ON	If HOLD FLAME is set to ON in main menu then this function starts at any case. If HOLD FLAME is set to AUTO in main menu, then this function starts if time set with this parameter is shorter than 2 sequential WAITING times.	min	15	5	30	15	5	30
PAR12	HOLD FLAME OFF	Max time when burner holds flame. HOLD FLAME function in main menu has to be set to AUTO or ON.	min	60	30	90	60	30	90
PAR13	MIN POWER	Minimum power level up to what burner decreases output power. Applies if POWER in main menu is in AUTO status only	kW	12	10	20	18	15	30
PAR14	MAX POWER	Maximum power level up to what burner increases output power. Applies if POWER in main menu is set to AUTO only	kW	18	10	20	27	15	30

PAR15	POWER UP	Timeframe to burner to increase power to one level up if BURNING state lasts longer than set with this parameter. Applies if POWER in main menu is set to AUTO only	min	30	2	120	30	2	120
PAR16	POWER DOWN	Timeframe to burner to decrease power to one level down if BURNING state lasts longer than set with this parameter. Applies if POWER in main menu is set to AUTO only	min	30	15	60	30	15	60
PAR17	UP CYCLE	Pace of increasing pre-set power level 1 kW part-steps	min	1	0	3	1	0	3
PAR18	DOWN CYCLE	Pace of increasing pre-set power level 1 kW part-steps	min	2	1	3	2	1	3
PAR21	PELLETS NORMAL	Determines how many grams of pellets feeder auger transports to burning chamber with one full rotation when PELLET NORM ie normal weight pellets are selected	g/rot	30	28	38	30	28	38
PAR22	PELLETS LIGHT	Determines how many grams of pellets feeder auger transports to burning chamber with one full rotation when PELLET LIGHT ie lighter than normal weight pellets are selected	g/rot	28	25	38	28	25	38
PAR23	PELLETS HEAVY	Determines how many grams of pellets feeder auger transports to burning chamber with one full rotation when PELLET HEAVY ie heavier than normal weight pellets are selected	g/rot	34	28	40	34	28	40
PAR24	LOADING FEED	Number of feeder auger rotations in LOADING state	rot	21	20	40	21	20	40
PAR25	LOADING 2 FEED	Number of feeder auger rotations in LOADING2 state	rot	3	1	8	3	1	8
PAR26	END BURN FEED	Number of feeder auger rotations in END BURN state	rot	17	10	20	17	10	20
PAR27	END BLOW TIME	Fan's END BLOW time after flame has disappeared	sec	90	30	250	90	30	250
PAR30	FAN 2 TYPE	Flue gas fan control 1 - ON 2 - OFF 3 - AUTO not in use here 4 - not in use here 5 - working with underpressure sensor	1...5	2	1	5	2	1	5
PAR31	FAN 2@10(15)	Flue gas fan speed at 1. power level PV20(PV30)	%	25	5	80	25	5	80
PAR32	FAN 2@12(18)	Flue gas fan speed at 2. power level PV20(PV30)	%	30	5	80	30	5	80
PAR33	FAN 2@14(21)	Flue gas fan speed at 3. power level PV20(PV30)	%	35	5	80	35	5	80
PAR34	FAN 2@16(24)	Flue gas fan speed at 4. power level PV20(PV30)	%	40	5	80	40	5	80
PAR35	FAN 2@18(27)	Flue gas fan speed at 5. power level PV20(PV30)	%	45	5	80	45	5	80
PAR36	FAN 2@20(30)	Flue gas fan speed at 6. power level PV20(PV30)	%	50	5	80	50	5	80
PAR38	FAN 2 BASE	Changing amount of flue gas fan base air with flue gas fan speed setting in all power levels	%	100	65	140	100	65	140
PAR39	FAN 2 MIN	Flue gas fan minimal speed	rps	20	5	20	20	5	20
PAR40	PHOTOCELL LEVEL	Flame sensor sensitivity. Higher number means that flame is recognized when less light	%	84	50	100	84	50	100
PAR41	PRE-BURN TIME	Length of one PRE-BURN cycle state	sec	40	30	80	40	30	80
PAR42	PRE-BURN CYCLE	Number of PRE-BURN cycles. Total length of PRE-BURN cycles is length of one cycle times number of cycles	X	3	1	4	3	1	4
PAR43	OVERHEAT TEMP.	Preset burners inner temperature. Threshold level for OVERHEAT error	°C	60	50	70	60	50	70
PAR46	FEED CURRENT	Preset feeder auger motors current. Overcurrent protection threshold	A	2	0,5	5	2	0,5	5
PAR47	GRATES CURRENT	Pre-set pneumo-valve current. Overcurrent protection threshold	A	0,6	0,1	1	0,6	0,1	1
PAR48	CLEANING CYCLE	Pre-set time between two grate cleaning cycles 0=CLEANING OFF	min	120	0	250	120	0	250

PAR49	CLEANING TIME	Opening time of pneumo valve in cleaning cycle	1/2sec	3	0	10	3	0	10
PAR50	RELAY ERROR	ERR output function selection 1- relay NO 2 - relay NC 3 - Circulation pump control (accum. tank loading) 4 - reserv 5 - 230V solenoid valve control (pneumatic clean version) 6 - turbulators control	1…6	6	1	6	6	1	6
PAR52	SMS COUNT	Selecting number of phones receiving alert SMS	0…5	0	0	5	0	0	5
PAR53	TEMP.TYPE	Determines temp. sensor plugged to TMP1 connector 0 - no sensor 1 - burners over temp. sensor 2 - external temp. sensor	0…2	1	1	2	1	1	2
PAR54	TEMP.LEVEL	Set-point value for temperature sensor plugged to TMP1	°C	70	30	240	70	30	240
PAR55	TEMP.HYST	PAR54 maximum set point hysteresis	°C	5	2	10	5	2	10
PAR56	TURBUS CYCLE	Time between two cleaning cycles of turbulators	min	60	0	250	60	0	250
PAR57	TURBUS TIME	Lenght of turbulators cleaning cycle	sec	60	10	250	60	10	250
PAR58	BASE FREQUENCY	Grid frequency	Hz	50	45	63	50	45	63
PAR60	FLUE GAS TYPE	Not in use here	-	0	0	2	0	0	2
PAR61	DRAFT SET	Flue gas fan pre-set pressure set point	-Pa	8	0	250	8	0	250
PAR62	DRAFT ERROR	Draught error threshold value. When set = 0, no draft error counted.	+Pa	10	0	20	10	0	20
PAR63	DRAFT BASE	Draught sensor calibration value	%	110	50	150	110	50	150
PAR66	OXYGEN TYPE	Type of oxygene sensor: 0 no sensor; 1 4..20mA=0..25%; 2 4..20mA=0..20%	0…2	0	0	1	0	0	1
PAR67	OXYGEN SET	Oxygen level setpoint	%	6	4	12	6	4	12
PAR70	HEAT UP TIME	Initial heat up time for burners with ceramic burning chamber	min	0	0	60	0	0	60
PAR71	HEAT UP POWER	Initial heat up power for burners with ceramic burning chamber	kW	3	1	10	3	1	10
PAR99	BURNER TYPE	Selecting model of burner. Software of wrongly selected model works incorrectly	-	20b	20a	500	30b	20a	500

In order to restore factory /default settings select PAR99 and click OK, model of burner starts to blink, click OK again.

11 Annex 4 List of languages

Table 15 List of languages

Language

ENG	English
SPA	Spanish
EST	Estonian
FIN	Finnish
FRA	France
GER	Germany
GRE	Greece
HRV	Croatian
LIT	Lithuanian
LAT	Latvian
NED	Dutch
POR	Portuguese
RUS	Russian
SLO	Slovenian
SRB	Serbian
SVK	Slovakian
SWE	Swedish

Warranty

Warranty objects in this context are pellet burner PV20a and PV30a and augers PA15XX or PA 20XX.

Producer gives 2 years warranty from the date of sale for the PV20a and PV30a burners and PA15XX and PA20XX augers.

Warranty is valid only in country where the burner is bought from.

2-year warranty for burning chamber is valid only in case when burning chamber and boiler are cleaned with sufficient care from ash and non-burning residues in the way that they can not cause deformation and out-burning of burning chamber.

Exeption is ignition element (igniter), for this item warranty is 1 (one) year.

Warranty is valid when user has not made changes in the construction and setup of the burner.

Warranty does not cover defects caused by an accident, misuse, abuse, improper installation or operation, lack of reasonable care, unauthorized medication, loss of parts, tampering, attempted repair by a not authorized person, mains errors, using poor quality fuel or negligent cleaning.

Warranty is valid only if the bottom half of the warranty ticket is filled in and sent or brought to the office of Pelltech OÜ Sära tee 3, Peetri, Rae vald, 75312 Harjumaa ESTONIA

Ph.. + 372 677 5277
www.pelltech.eu
info@pelltech.ee

Warranty ticket

Burners model	**PV20a/PV30a**
Product number	……
Sales date	……
Installation/commissioning date	……
Owners contacts	Installers name and signature
Name ……	……
Phone nr ……	……
City/village ……	
Street/ House ……	

……

Warranty ticket

Burners model	**PV 20a/PV30a**
Product number	……
Sales date	……
Installation/commissioning date	……
Owners contacts	Installers name and signature
Name ……	……
Phone nr ……	……
City/village ……	
Street/ House ……	

Warranty is valid only if the bottom half of the warranty ticket is filled in and sent or brought to the office of Pelltech OÜ Sära tee 3, Peetri, Rae vald, 75312 Harjumaa ESTONIA

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